

SENSORY ORGANIZATION AND ATTENTION: A PERSONAL JOURNEY WITH HEMI-SYNC®

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For the past twenty-five years I have worked professionally with children whose lives were influenced by a sensorimotor disability. The specific diagnoses of these youngsters varied, including labels such as cerebral palsy, autism, mental retardation, attention deficit disorder, and specific learning disability. One characteristic was common for the majority—a difficulty perceiving, organizing, or integrating sensory information, and a reduced ability to focus attention for effective learning.

These children have been my teachers who have allowed me to learn a great deal about my own ability to process information and to be attentive and focused when I desired to be. They have taught me much about learning environments that reduce or enhance the ability to process information efficiently. I have learned from them because they constantly remind me that all of life is a continuum. What the world labels a disability is simply a behavior at the far end of the continuum that tends to interfere with full participation in life. As I understand the issues and challenges in their lives, I gain greater insight into my own.

SENSORY INTEGRATION IN DAILY LIFE

Sensory input plays a critical role in brain function. Sensations from hearing, vision, taste, smell, touch, pressure, and movement provide the input to the brain that is organized for movement, cognition, and learning. The richness of the sensory environment and the interactive experience of the individual with the environment contribute to the growth of intelligence.

Sensory integration is a term used to describe the way in which the brain sorts out and organizes for our use the many sensations we receive. It enables us to focus attention selectively and reduce awareness of sensory input that is temporarily unimportant. It allows us to “put together” parts to create a whole. It attaches meaning to sensations through comparing

them with past experiences. It enables high levels of motor coordination. It is the basis of perception.

There is a continuum of skill in sensory processing and integration. Individuals experience varying degrees of sensory organization and integration. None of us organizes sensations perfectly or consistently. A high level of sensory integration may enable an individual to be a skilled gymnast, an artist, or a business entrepreneur. Most of us have average abilities in this area. The normally functioning person with low normal sensory integration may be physically clumsy or dislike being in a noisy environment.

Variations are also present within the same individual. A high level of sensorimotor skill and sensory integration can be reflected in sports performance in the individual who also has a low level of sensory integration for reading skills.

Each of us has a range of internal variability in the skill with which we organize and respond to our sensory world. Our language contains expressions which reflect this range of personal experience. Comments such as “I just couldn’t get it all together,” “I felt especially touchy about that,” or “I feel as if I’m on overload,” reflect our experience with the lower ranges of sensory processing and integration. For most of us this is a transient state triggered by fatigue, overwork, or a situation which places high demands on the ability to focus attention and reduce distractions. The threshold for moving into sensory overload with reduced sensory integrative skills varies greatly among individuals. One person may experience a high level of energy and a normal ability to focus the attention at a complex business meeting or a convention. Another person in the same environment may experience fatigue and confusion.

When children or adults experience sensory integrative difficulties, the brain does not process or organize the flow of sensory impulses in a way that gives them precise information about themselves and the world. Learning is difficult and individuals often feel uncomfortable with themselves and have difficulty coping with stress and demands. This often results in additional emotional or behavioral difficulties. If this is a temporary situation, the individual may feel frustrated, discouraged, or antisocial. If these experiences recur frequently or in specific situations, situations that are associated with reduced functioning, they may be consciously avoided.

NEUROLOGICAL ORGANIZATION AND SENSORY INTEGRATION

Sensory integration occurs at all levels of the central nervous system. However, the brain stem (including the midbrain, pons, and medulla oblongata) appears to play the most significant role in sensory processing. The brain stem and the thalamus receive sensory information from every sensory modality. Information passing through these structures is modified, integrated with other sensory information, and directed to the brain’s cortex.

As multiple sensory information impinges upon the brain, a finely tuned filter system comes into play. Sensory input pertinent to the individual's inner needs and goals reaches a level of consciousness. Input which is less important or distracting is dampened down centrally. The reticular formation in the brain stem (which plays the central role in this filter system) is often considered the master control mechanism of the central nervous system. It helps the brain to focus on one type of sensory input by inhibiting other types of input. This allows the individual to focus attention, and reduces the level of distraction.

Children who have been labeled hyperactive or individuals temporarily on sensory overload are unsuccessful in filtering out irrelevant information. They are pulled from one experience to the next and are unable to maintain the focus of attention needed for successful learning. If the overloading situation is sustained or occurs frequently, the individual usually discovers ways of reducing or deadening the sensory input. An autistic child may retreat to an inner world through organizing or hypnotic activities such as rocking, rhythmical spinning of objects or flapping fingers, avoiding eye contact, or hyperventilating breathing patterns. A normal adult, experiencing a reduction in the ability to filter sensory input and poor sensory integration may use variations of the same strategies. They may find eye contact more difficult, move to an inattentive world of daydreaming, or use alcohol or drugs to deaden the senses and find greater internal calmness.

HEMI-SYNC® AND SENSORY INTEGRATION

Hemi-Sync is an excellent example of the sensory integrative process of the brain. Two independent auditory signals are integrated in a way that produces a whole (i.e., Hemi-Sync,) which is different from each of the separate parts. Initial processing and integration occurs in the brain stem. In addition, the tendency toward synchronization of the right and left hemispheres appears to enhance attention, sensory and extrasensory awareness, and intuitive processing, and to increase successful adaptation to personal experiences.

Since 1981 I have been using Hemi-Sync with young children who experience sensorimotor and sensory integrative disabilities. Both clinical experience and preliminary research indicate that the addition of Hemi-Sync signals (containing frequencies which produce more theta patterns in the brain) to background music increases the child's focus of attention, calms the emotions, and creates a mental set of open receptivity. These responses are consistent with those reported by adults using Hemi-Sync tapes during their *GATEWAY VOYAGE®* experience.

However, an unexpected response was seen in children who, prior to Hemi-Sync therapy, experienced severe difficulties with sensory organization and integration. These children showed major difficulties accepting touch to their bodies. Gentle hugs, light calming strokes or pats, or accidental touching usually elicited strong aversive reactions. The child would push the

touching person away, screech or cry, hit the person, or withdraw and begin a series of stereotyped self-stimulatory behaviors. They did not like to get their hands messy, have their hair washed or combed, or sit outside in the wind and grass. Many of the children became frightened and disoriented with movement or changes of position. They tended to increase these behaviors in complex sensory environments. A busy household, a school classroom or cafeteria, or a trip to the grocery store would reduce the child's ability to function and would increase the frequency and strength of the behaviors used to cope. Because of the intensity of their reactions to their environment, most of these children were labeled autistic, profoundly retarded, or emotionally disturbed.

When Hemi-Sync was added to therapy and classroom environments, these children responded in a totally different way. Eye contact increased. They accepted touch and became curious and interested in the sensory input. They were no longer startling and putting their hands over their ears to sounds that were previously upsetting. The amount of frustrated screeching and crying was reduced, and more functional communication emerged. There was a reduction in behaviors previously used by the child to cope with sensory overload. The children stopped rocking, spinning, and flapping and began to pay attention.

A new set of questions emerged from these experiences. It appeared that the Hemi-Sync signals enhanced the child's ability to organize and integrate sensory information. This resulted in an increase in the ability to focus attention, to discriminate specific sensory properties, and to filter unwanted sensory input. What were these children telling us about the use of Hemi-Sync in our own lives?

A PERSONAL EXPERIENCE: HEMI-SYNC AND SENSORY ORGANIZATION

For most of my life I have experienced sharp swings in my ability to organize the sensory environment. I have always functioned best in quiet spaces. When sensory complexity is reduced, I am able to think more clearly, and to be more creative. It is as if a reduction in external stimulation allows inner connections to be stronger, and increases my awareness of inner messages and intuitive insights. Many noisy and complex experiences caused fatigue and internal frustration as I was growing up. The noise and natural exuberance of a football game, the chatter of a party, the external complexity of a business meeting or convention triggered an intense experience of overload. I was painfully aware of inner confusion, of misunderstanding what people said, of poor memory, of reduced eye contact, of being physically and emotionally touchy, and of the body-aching fatigue that usually resulted from such encounters. The fatigue and a desire to go to sleep were always present, and as they became stronger, I was aware of even poorer abilities to cope with the situation. I participated in a limited way in these activities, but was always the first to go home, or the one who fell asleep in the middle of a party. I was painfully shy, and very much of an introvert. Some people

described me as antisocial. In quieter situations I was comfortable and outgoing. The world seemed to make more sense, and relationships with other people were easy and pleasurable.

My initial participation in the *GATEWAY VOYAGE*® in the spring of 1981 facilitated a different set of responses to my normal environment. I first noticed it during the plane trip home. I generally experienced airports as extremely stressful places. The bustle of people, the overwhelming smells from snack bars, and the random announcements of plane departures required a good bit of conscious focusing and sorting out to get me to my destination. I arrived home from that trip in a calm and peaceful state of mind and body. I noticed this change with interest, but thought little about it.

I was working in a hospital clinic for children with cerebral palsy at the time. On clinic days my ability to function efficiently was pushed to the maximum. In a five-hour period, I might see six children for evaluations. There was no real schedule, and a therapist would just pick up the next child who was ready. Thus, there was no way of preparing for a specific child. This was followed by a staffing session in which five or six different professionals would discuss findings on each child and decide upon a set of recommendations. This meeting was usually chaotic, and interspersed with ringing telephones and a general sense of impatience. At the end of the meeting I was expected to type a brief report for each child while sitting in an office with two other persons who were writing reports or talking on the telephone. I was exhausted and constantly frustrated with what I had agreed to do. After my GATEWAY program, I had some new tools. I listened to a METAMUSIC® tape through my Walkman™ as I prepared for the clinic day. I found a quiet therapy room during lunchtime and listened to the *Catnapper* tape before the staff meeting. I wore headphones and was supported by the *Concentration* tape while writing reports.

As I included at least an hour of Hemi-Sync listening a day, I found myself able to deal easily with most parties, sports events, and shopping trips without specific preparation. My life and perspective expanded. The ease with which I communicated during professional workshops and responded to questions from a large group increased perceptibly. My personal and professional life changed and I was happier and much more effective and efficient. I didn't think much about why Hemi-Sync helped me this way until last fall.

I was invited to present a three-hour Short Course at the annual convention of the American Speech-Hearing-Language Association in St. Louis, Missouri, in November of 1989. In the past, ASHA conventions have represented the outer limits of my ability to cope. The meeting is usually attended by 7,000 to 10,000 persons. Sessions are held in three or four different hotels in a city, and rooms often fill quickly for the more popular lectures or topics, leaving many people unable to get into the sessions they desire. An exhibit hall the size of two to three

football fields with hundreds of exhibitors provides an additional auditory and visual feast. I accepted the invitation and was informed that my Short Course sold out immediately, and I could expect to teach a group of 500 persons! I had not attended an ASHA convention for ten years and had no experience with meetings of this size since my introduction to Hemi-Sync. I assumed that since my overall response to busy meetings and conferences had improved, I would have no problem with the environment of the ASHA convention. I was discouraged and disappointed to discover all of the old patterns emerging by the afternoon of the first day. The fatigue was intense, and I was aware of my distractibility and feelings of impatience, and lack of desire to socialize with old friends with whom I had anticipated spending time. I blamed it on a late arrival the night before due to airport delays and a lack of sleep. I was sure that I'd be better the next day.

The next morning, I began my day with the *Morning Exercise* tape and created the images for an easy and relaxed day of learning. Suddenly one of the children with severe sensory integration dysfunction entered by image. There was an instant knowing that the problems I had been experiencing the day before were caused by sensory overload and a reduction in sensory integrative abilities. For the first time I saw the connection between my own difficulties and those of the children with whom I had been working. The child in my image presented me with headphones and a Hemi-Sync tape, and I saw myself wearing the headphones as I attended the rest of the convention. The remaining three days of the convention were blissful. I stuck my Walkman in my suit jacket, put on the headphones and listened to the *Concentration* tape during all lecture sessions. This provided the narrow focus of attention that was conducive to learning. While roaming the halls, visiting the exhibits, and moving between meetings, I changed to my favorite METAMUSIC tape, *Midsummer Night*, which created a more open focus for my awareness. I was immediately aware of the increase in my ability to concentrate and remember what I learned in the various lectures and courses I attended. What was even more impressive were the feelings that accompanied the day. I was happy and calm. Friends I hadn't seen for some time emerged effortlessly. Even in the midst of a crowd, the person stood out among the others and seemed to drift my way. I had looked forward to a minicourse on a topic of particular interest. When I arrived, the room was filled and I was not able to attend. I was aware of a brief sense of disappointment, but the inner sense that something more important would happen. I left the room and immediately ran into a colleague whose presentation I had attended that morning. We sat down for tea and explored some of her ideas and experience in greater depth. I was immediately glad that the full room had given me this opportunity. My energy level was unusually high throughout the remainder of the convention and I enjoyed my time there without fatigue.

In August of 1990 I attended an intermediate hammered dulcimer workshop at the Augusta Heritage Center in Elkins, West Virginia. I have always been a closet dulcimer player; the prospect of expanding my skills and learning to play in a group was both exciting and terrifying. The class provided a challenge to my sensory integrative abilities that I had not expected. New

playing skills were taught primarily by learning a tune by ear, and then developing the ability to hear specific chords, embellishments, or rhythmic styles. I was expected to play what I had heard. Learning by ear has never been a strength, and situations that depended on it have usually led to frustration, and a reduction in my ability to play. In addition, we were encouraged to practice what we were learning during class. At intervals, sixteen hammered dulcimers would begin to practice a tune or technique. These were not times of playing together, and the resulting cacophony was overwhelming. I found it impossible to hear my own instrument and get any feedback in the din that resulted. I wondered if Hemi-Sync would help and decided to experiment.

The next day I wore my headphones and listened to the *Concentration* tape softly throughout the day. I listened to the new patterns with greater ease. I was aware that even though I could not play the pattern smoothly, or even remember the tune with ease, there was not the emotional overlay I had experienced before. Rather than feeling that I would never be able to do this, I simply knew that I was learning and would be able to produce what I had learned at a later time. I don't know whether the Hemi-Sync increased my ability to learn, but I know that it prevented me from unconsciously interfering with my own learning by eliminating negative messages and scenarios. The most noticeable difference was my ability to hear my own instrument and to concentrate during the group practice times. Even when I did not wear the headphones, there was a carryover, and the sound of my own dulcimer came to the foreground of my awareness.

I was interested in exploring differences between open focus and narrow focus of attention during the dulcimer class. The *Concentration* tape provided excellent support for the narrow focus of attention. In the past, I have achieved the wider, open focus by listening to a METAMUSIC tape. This, however, was not an alternative when the desired open focus was on a broader awareness of another piece of music or playing style. One day I listened to the *Free Flow 12* tape during class. I found my consciousness flowing with the music, but flowing right out of the room—with a clear feeling of having missed most of what was being taught! I listened to the *Surf* tape and felt an intense desire to close my eyes and nap! I ended up moving to a relaxed, open Focus 10 or Focus 12 state without the tape and my awareness of the total feel of a piece of music increased.

I now often listen to Hemi-Sync tapes or meditate just before practicing my dulcimer. When I do this, there is an automaticity and flow to my playing. It almost feels as though there is a road map on the dulcimer and my hammers know just where to go.

I have experimented with different types of earphones during the past year. Ideally, I would like for my Hemi-Sync backup to be unobtrusive. I do not wish to give the impression that I am not paying attention or am listening to something unrelated. As an alternative to headphones, I have tried the small, in-the-ear buttons. These have not worked well for me because in order to

stay easily in the ear, they must fit tightly. This puts the Hemi-Sync into the foreground rather than the background, and detracts from listening to a speaker. Although headphones are larger and are obvious to others, they allow sound to come in around them, enabling an easier mix of the Hemi-Sync and room sounds.

CONCLUSIONS

Hemi-Sync enhances the sensory integrative abilities of the brain. The responses to Hemi-Sync signals are most dramatic in children and adults with severe sensory integrative dysfunction. However, a similar improvement in processing and focusing abilities is seen in individuals with normal sensory integrative abilities. Each of us varies in the ability to organize and integrate internal and external sensory information for learning. We are aware of situations in which our abilities emerge with ease, and other situations in which a sense of overload and disorganization predominates. Hemi-Sync can help each of us learn and function in the easy and effortless way that is associated with high levels of sensory organization and integration.

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